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CALIFORNIA ELECTRICAL CONTRACTORS' CONVENTION.

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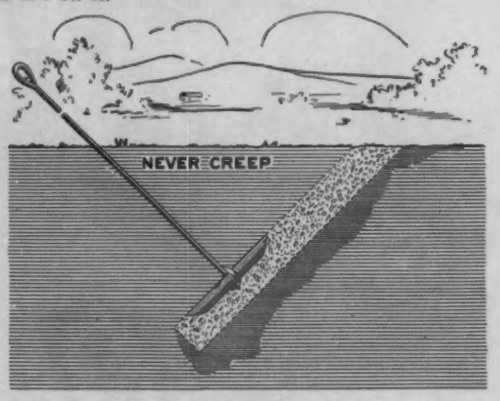

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PROGRESS UPON THE HETCH HETCHY PROJECT

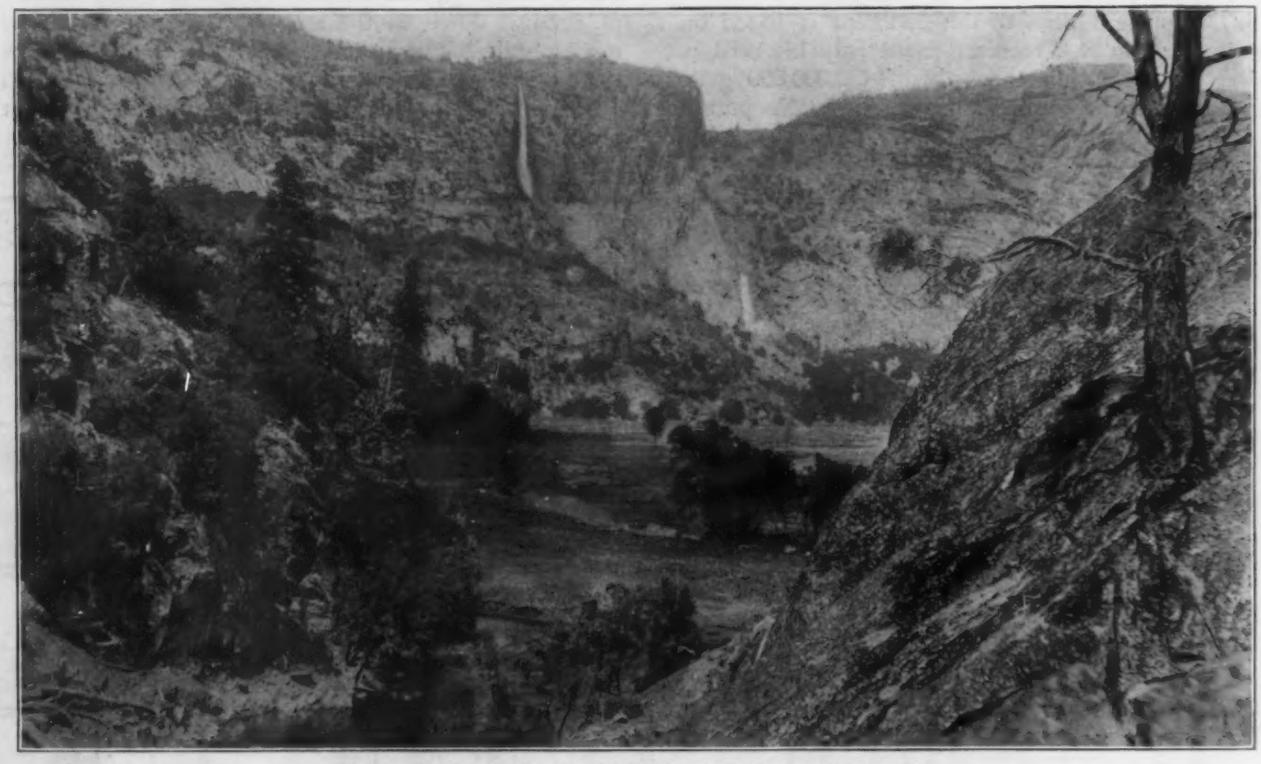
BY ROBERT SIBLEY.

The Hetch Hetchy project has been conceived to supply the people of the San Francisco Bay region with pure mountain water from the Sierra Nevada Mountains. In its ambitious size and the daring it involves this represents perhaps the greatest project in the history of municipal undertakings.

Notwithstanding the ever-increasing developments by the Spring Valley Water Company, the citizens of San Francisco have long seen the ultimate need for a far greater supply than can possibly be delivered by any local enterprise. So, for the last fifteen years the engineering force of the city has been scouring California for possible means of future water resources. A dozen different projects have been examined, and the one which has seemed most feasible to the city's engineers is the Hetch Hetchy development.

The Hetch Hetchy Valley of the Tuolumne River is situated in the Yosemite National Park, some 150 miles directly east of San Francisco. Immediately to the north of this valley is Lake Eleanor and its drainage basin, together with the Cherry River drainage area, both of which are to be included in the development scheme.

The principal reasons given for the adoption of this project are the lower cost of construction, the abundant water supply and a purer quality of water than any other obtainable.



Hetch Hetchy Valley Looking Through Proposed Damsite.

In May, 1908, a permit was obtained from governmental authorities to use Lake Eleanor as a site for a storage reservoir, with further permission to use the Hetch Hetchy Valley as a storage site when the limit of storage of Lake Eleanor had been reached. This permit was later called in question by the Department of the Interior at Washington, as two objections had been raised. The one was that prior rights to the waters were being jeopardized, and the other that

the natural beauty of a great scenic national park would be destroyed.

These contentions have led to endless hearings, and are even now not entirely settled, although the

Typical Railroad Bed Work Now Completed by City of San Francisco.

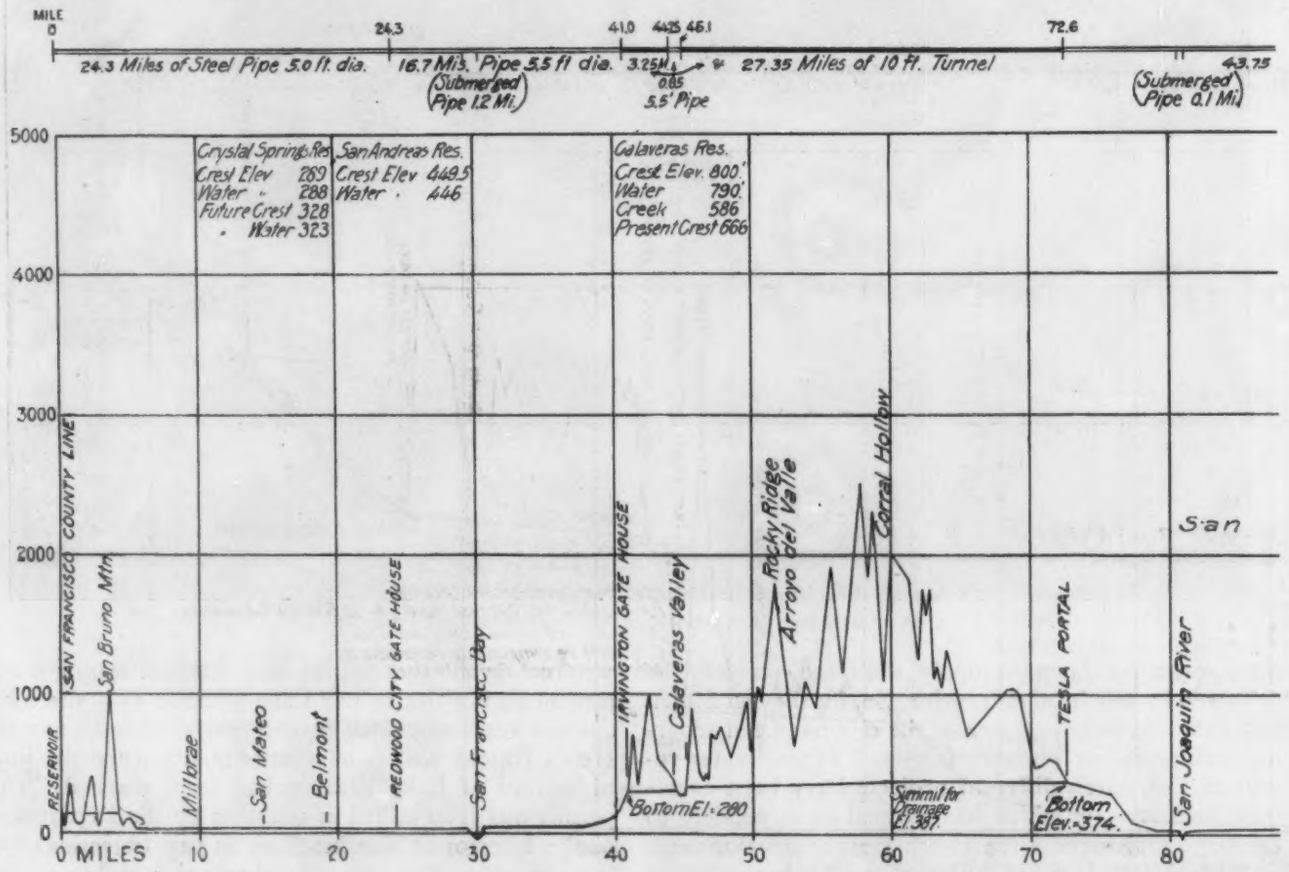
matter has been approved by Congress, and the "Raker Bill" was signed by President Wilson on December 19, 1913, enabling San Francisco to proceed with the work under certain definite conditions.

The present plan of development is based on a report by John R. Freeman, dated July 14, 1912, providing for an ultimate supply of 400,000,000 gallons per day from the Tuolumne watershed. No pumping will be necessary, the tunnels making a gravity delivery possible. The Hetch Hetchy Valley will be utilized as the first reservoir site by means of a 350 ft. masonry dam placed in the narrow gorge at the lower end of the valley, which is to be flooded to an average depth of 270 ft. for a length of seven miles. The aqueduct in the initial development will consist of 88 miles of pipe 5 to 5½ ft. in diameter, and 66 miles of tunnels 10 to 10½ ft. in diameter, a total length of 154 miles to the county line of San Francisco. After the first 19 miles of aqueduct from Early Intake is completed, the water will be dropped 1300 ft. to an electric generating station at Moccasin Creek, where an average of 66,000 h.p. will be available. The tunnels will be in the Sierra Nevada and the Coast Range Mountains. The pipe will cross the San Joaquin Valley and extend from the tunnel outlet in the Coast Range to storage reservoirs. The San Joaquin River and the head of San Francisco Bay will be crossed by submerged siphons.

The cost of the first unit in the water development is estimated at approximately $44,147,000. The final completion of the entire project for delivering 400,000,000 gallons daily to San Francisco Bay district will cost about $77,000,000.

The Early Intake.

Eventually the water will be carried entirely in closed conduits, but for the present the first 12 miles of conduit down to the mouth of Cherry Creek will not be built. The water will be allowed to flow down the natural bed of the Tuolumne River to the Early Intake. At this point there will be built a temporary



Profile View of Development Scheme from

City Engineer's Schedule of Expenditures for Hetch Hetchy Water Supply System.
(City Distributing System Not Included.)

			Hetch Hetchy Aqueduct.									
Year.	General engineering, legal expense, water supply investigations, hydrography.	Lands, water rights, rights of way.	Hetch Hetchy Railroad.	Lower Cherry Canal and Temporary Power Plant.	Hetch Hetchy Reservoir.	Tunnel Early Intake to Moccasin Creek	Tunnel Moccasin Creek to east side San Joaquin Valley.	San Joaquin Valley pipe line.	Coast Range Tunnel.	Pipe line Irvington to San Francisco.	Moccasin Creek Power Plant, initial installation, 37,500 K.W.	Totals for entire system.
1900 to '15.	$558,000	$1,285,000	$ 200,000	.....	$ 150,000	$ 74,000	.....	.....	.....	.....	.....	$ 2,267,000
1916	$ 65,000	$ 25,000	$1,650,000	$120,000	$ 160,000	$ 50,000	.....	$ 5,000	$ 10,000	.....	.....	$ 2,085,000
1917	.....	.....	.....	120,000	700,000	750,000	$ 10,000	30,000	125,000	$ 10,000	.....	1,745,000
1918	Expenditures under		Cost of operation and		900,000	1,300,000	40,000	65,000	1,000,000	40,000	.....	3,345,000
1919	these two heads after		maintenance of rail-		1,100,000	1,300,000	150,000	300,000	1,500,000	250,000	.....	4,600,000
1920	1916 are included in		road and power plant		1,140,000	1,300,000	500,000	700,000	2,000,000	700,000	$1,400,000	7,740,000
1921	construction costs of		is included in con-		.....	1,300,000	1,000,000	1,300,000	2,000,000	1,300,000	2,000,000	8,900,000
1922	reservoir, aqueduct		struction cost of res-		.....	.....	1,200,000	1,300,000	3,000,000	1,300,000	.....	6,800,000
1923	and power plant.		ervoir and aqueduct.		.....	.....	1,100,000	1,300,000	3,000,000	1,265,000	.....	6,665,000
Totals ..	$623,000	$1,310,000	$1,850,000	$240,000	$4,150,000	$6,074,000	$4,000,000	$5,000,000	$12,635,000	$4,865,000	$3,400,000	$44,147,000

overflow dam about 45 ft. high and 500 ft. long, together with a temporary power plant for power necessary in construction work. The temporary dam will intercept the water released from the Hetch Hetchy reservoir and divert it into a pressure tunnel 10½ ft. in diameter. The initial work in driving this tunnel is now under way.

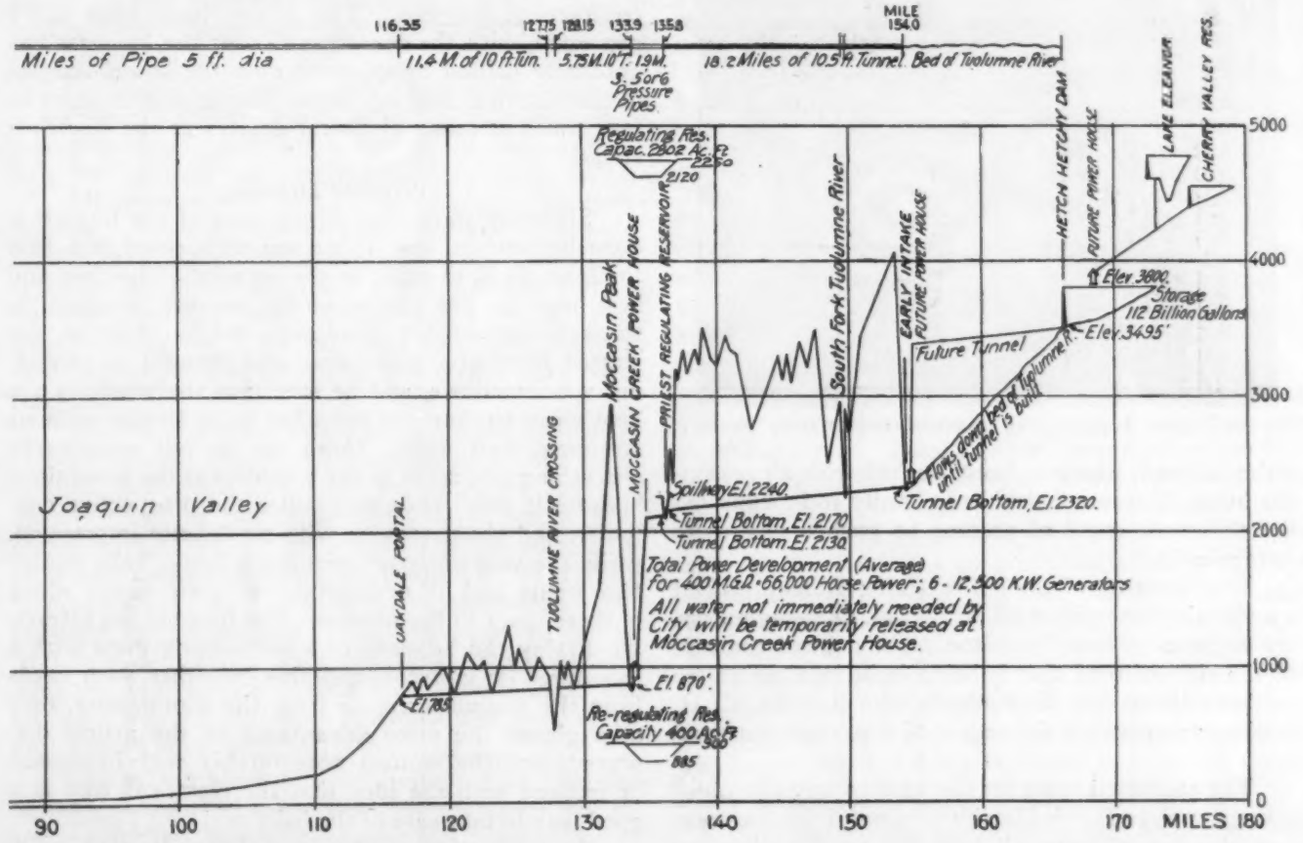
Power Houses.

The power house site at the first drop in the aqueduct is located beside the main highway at Moccasin Creek, and whenever the upstream 12 miles of aqueduct between the Early Intake and the Hetch Hetchy dam is built, another drop will be available just above the Early Intake. At this power site there will be a net drop of 1325 ft., which will deliver to the city about 60,000 electrical horsepower continuously.

At some future date, when the needs of the bay district shall demand it, the Cherry Creek and Eleanor units, with reservoirs at higher levels, will be added to the system. The waters from these two sources will be delivered to the Hetch Hetchy reservoir by means of concrete lined tunnels 8 ft. in diameter, driven through the north walls of the valley and tapping the lakes from beneath.

Present Status.

Summarizing the present status of the project, in so far as construction features are concerned, ignoring the legal aspect of the case, the situation is briefly about as follows:



Hetch Hetchy Valley to San Francisco.

Preliminary details have been worked out. A 70-mile railroad is being constructed into the valley and will probably be in complete operation by next summer. A scenic road 22 ft. in width, six miles long with crushed granite base is already built into the valley floor. The timber clearing of the main valley floor is about completed. The division tunnel, 15 ft. in diameter, driven through solid granite at the base of the damsite awaits only the blasting of a 15 ft. shelf at the lower water mark to be complete. In addition to this work certain development work is being conducted at the Early Intake, 12 miles below the proposed Hetch Hetchy dam. Until the completion

Proposed Dam as Marked on Rocks in Hetch Hetchy Valley.

of the railroad, which is being pushed with all reasonable haste, is accomplished, it is hardly to be expected that the work could at present be pushed any more energetically.

The directing of the entire Hetch Hetchy project is under the supervision of Mr. M. M. O'Shaughnessy, city engineer of San Francisco. The general contract for the city railroad that is being built into the valley has been let to Mr. F. Rolandi, who has Mr. C. H. Spinks as responsible field agent to supervise construction.

The estimated costs for the various units involved in the complete Hetch Hetchy scheme of development over the seven years allowed for construction are distributed as shown on the previous page.

HOW TO HANDLE THE DEALERS' PROBLEMS

BY M. L. SCOBEY.

(This instructive account of effective sales methods was presented at the annual convention of the California Association of Electrical Contractors and Dealers, Stockton, Cal., June 15-17, 1916. The author is manager of the Hine Electric Company at San Francisco.—The Editor.)

While the contracting business is by far the larger, it is no more important than the retail end of the electrical industry. I am sorry to have to admit that heretofore it has in reality been the end, or I might say the tail-end, of the industry; whereas it should be foremost. That is the goal that the dealers of San Francisco are working toward.

About two years ago the retail electric shop or store was simply a by-product of the contractor's business. During the past two years big improvements have been made, but there is still room for bettering our business and putting the retail electrical store at the head of the industry, where it really belongs.

In the larger cities the retailing of electrical devices is done mainly by the department and hardware stores as well as by druggists and grocers. It is this condition that we have to face and see if we can't reclaim the business and get it flowing in the proper, natural channels—namely, to the retail electrical dealer.

In order to correct this condition we have to find out where we have failed, and I'll tell you what in my opinion has been the trouble in the past, and what we should do in the future to put our business on a paying basis.

It is safe to assume that fully seven-eighths of the retail stores are operated by people or firms in the contracting business. The stores have been sadly neglected, with the consequence that the business has gradually drifted away, until now the stores outside of the electrical industry are disposing of from three to four times as many electrical devices as the electrical shops.

Window Dressing.

Statistics show that 80 per cent of the buying is done by women, and if we are to succeed, the first thing to do is to cater to the women. The first and best way to get the women's interest aroused is through our display windows. So in order to get started right give some time and thought to arranging your windows, and be sure that the windows are kept clean so they can see what is on display without straining their eyes. Don't try to put samples of everything you carry in the windows at the same time, because it only tends to confuse the prospective customer, and she passes on with no definite impression, while the value of your window is lost. Take one or two items and if necessary, put your entire stock of those items in the window. For instance, an attractive display can be made of a few curling irons with a hair-dryer or vibrator, and this, together with cards from the manufacturer or from the sign-painter, tells at a glance the price advantages of the article displayed, and the woman goes on her way impressed or imbued with the idea that the electrical way is a good way to take care of the hair.

An interesting window can always be made with flat-irons and perhaps a few No. 92 Benjamin Plugs,

showing how the ironing may be done and at the same time light may be had from the single socket ordinarily found in the kitchen.

Borrow some of your wife's best china and silver and use it for another display in connection with toasters, percolators, samovars, and chafing dishes, and just as soon as you begin to give the question some thought and study, you will be surprised to find the number of combinations that can be worked out; but don't, for your own sake, try to crowd your windows with a dozen different classes of goods.

Let's assume now that your windows are attractive enough to have the woman come in to buy a curling iron or some other device. What is she going to find when she gets inside the door? Will she have to pick up her skirts to step over some short lengths of conduit or molding left on the floor, or will she find the counter or showcase covered with dust or littered with condulet catalogs and papers to such an extent that she can hardly find a place to lay her purse while she investigates the article she is looking for? If she does, even though she may possibly make the purchase, chances are nine times out of ten that the next time will find her on the way to the department store instead of coming back as she should.

I have been in some stores with conditions even worse. I have seen journeymen's or shop tools on the counter or floor, or both. I have seen barrels on the store floor with straw scattered about. I have seen show cases where the dust has been so thick I could write my name on it. I have seen people behind the counter who did not seem to know what they had in stock or where it was kept, and sometimes after it was finally located they had to look up and find out the cost and then figure out what they should charge the customer.

I am not exaggerating conditions a bit, and I tell you that such things are distasteful to anybody, either man or woman; and that is one of the main reasons why our business has been getting away from us.

All this can be easily remedied at practically no expense whatever. An investment made in brooms, dusters, and a good chamois skin, together with a liberal amount of elbow grease is the solution. Try it out with your boy, and see how quickly you can wear these articles out. By the time they are ready to be replaced, you'll be willing to buy them by the dozen if need be.

Another important factor to be dealt with which I consider a vital one, is the illumination of our stores and places of business. Here we are in the electrical business, one of the main functions of which is to create light. We advocate light, we recommend to other merchants new lamps, new reflectors, all of which tend to attract people to their stores and increase their business, but what are we doing for ourselves, for our own lighting effects. We should set the example. Our windows and stores should be flooded with light. But are we doing it? Do your windows stand out as the best lighted in the city, and if not, why not?

This is very important, and in improving your own lighting you will be helping not only yourself, but the entire industry, besides obtaining and holding the respect that should be due our place in the business world.

True, you say that it costs money, and I grant you that, but I'll warrant that it will not increase your expense over $5 per month; and even at $5 per month, you couldn't find a better advertisement or one that will bring larger results.

Helpful Co-operation from all Quarters.

If there is any place in the United States for the electrical dealer, it is right here in California.

Perhaps you do not realize it, but we are working under better conditions here than in any other part of the country. We have the central stations and jobbers working, not only with us, but for us, because they realize that if our business is a success theirs is bound to be a bigger success.

Nowhere else in the country are the central stations maintaining such prices on lamps and current-consuming devices. Just stop a minute and think what it means. It's safe to say that 60 per cent of the dealers are paying their rent and even more, just on the profit from the sale of Mazda lamps, and where would we be or what chance would we stand if they saw fit to give free renewals, or sell lamps at their cost, which is below ours.

What could we do if they instituted campaigns on flat irons at $2 each; or on toaster at $1.75 each. It is being done elsewhere, but thank goodness, not practiced here, and it is up to the dealers of this association to turn to and show them that we appreciate what they are doing for us, by making our stores real places of business, making them attractive and not repulsive, and by carrying a representative stock so that consumers can get what they want, when they want it, and after they've got it, they'll go away knowing what they've purchased, what it will do, what it will not do, what it costs to operate, etc.

We also have to thank the jobbers for what they have done and what they are doing for our industry, for the time and money they have put in to start us on the right track. There was a time when the jobber would sell a bill of goods to a man putting up his own house or factory, but it's not the case now. Such inquiries are being turned over to the different members of this association, and it is that kind of co-operation that helps, and we should show our appreciation by supporting them, for by so doing we cannot help but increase our business and profits.

It is quite evident that the manufacturer is beginning to realize that there is such a person as the electrical dealer. Their attitude towards the dealers is quite different than it was a year or two ago, and today the manufacturers or their representatives are beginning to work with us through the jobber. They confer with us, they ask what we want, what we need, if the goods meet with public demand, and if we have any real grievances they are considered and generally remedied when we present them in the right way through the proper channels.

Just stop a minute and think what we have. They are all for us and none "agin" us, unless it be ourselves and our methods of doing business.

The Electric Range and Its Possibilities.

For the contractor-dealer, a big field has been opened by the development of the electric range. Here is an opportunity to get in on the ground floor and

keep this business to ourselves, but prompt and vigorous action must be taken, before the house-furnishing and department stores get started with the line.

In this instance we can get the start on our friends, the enemy, and by being first on the ground, the business will go to the contractor-dealer, and rightfully so, because you are the only ones who can both sell the range and make the installation, with a profit on both. The central stations are virtually handing this business to you on a silver platter, which, within a short time will undoubtedly be one of the main-stays of the contractor-dealer.

Get your sample range, connect it up, and then take steps to let the public know that you can not only sell them an electric range, but that you will make the installation without cost to them, which makes a pretty attractive proposition.

If the members of this association do not take advantage of this opening and get busy on the sale of ranges, the manufacturer and jobber will be forced to seek some other outlet, and if such a thing happens, we have only ourselves to blame.

The Importance of Stock Cards.

Another point I would like to bring out, because from my own experience, I believe it will be of great help to the electrical dealer, and that is the subject of stock card records.

Stock Card Records are not worth the cost of the paper if they are not kept up, but if it's worth while starting, it's worth while seeing that they are right up to the minute, and I'll tell you why. They keep down overstocks, because the cards show how much is on hand, and how much has been sold in 30, 60 or 90 days, and you can govern yourself accordingly when placing your orders.

In some instances your card records show where you can consistently increase your order on certain items and consequently get a better price, while on the other hand they show where it is to your advantage to cut down on some other item, because the turn-over is so slow that you are not justified in carrying that particular article in such large quantities.

Your cards also show from whom the goods may be purchased, what they cost and what they should be sold for, in order to return you a reasonable margin of profit on your investment. It gives you a perpetual inventory of your stock, and you will save much waste of time and labor that would otherwise be incurred if you did not use stock card records.

The Local Retailers' Association.

The San Francisco local of this association has a retailers' section, and before closing, I want to give a few instances of what we are doing for the good of the electrical industry, and perhaps an inkling of what we hope to accomplish.

We meet every Thursday night at 7:45 and adjourn at 9:00 p. m., and in that hour and a quarter take up and discuss problems and topics which we believe will benefit our retail business. Each one attending contributes ten cents each week to defray cost of postage, stationery, etc., so the expenses of the meetings are practically nil.

We talk over costs of the principal articles carried, their good or bad selling points, and in one or two instances we have found items where our gross profits on certain specialties was about 20 per cent, and we decided that the manufacturer could not reasonably expect us to exploit or even carry that specialty when the turn-over was so slow and the gross profit so small. We accordingly took the matter up with the jobbers and the result was that we are now enjoying a gross profit of 33 1/3 on that article, instead of 20 per cent, and we can now afford to carry it, and devote some time and window space to selling it, because the profit warrants our so doing.

We have adopted a schedule for the uniform dressing of our display windows. For instance, one week we all try to make a prominent display of flat-irons, then the next week flash-lights, and so on; and by doing this we believe that repetition or reiteration will make a deeper impression on the minds of the public when they see the same class of devices shown simultaneously on Market street, Polk street, Mission street, or wherever they happen to go.

We have started a co-operative plan of advertising our business, viz: the exclusive electric shop. We will make it a publicity campaign for the education of the public, endeavoring to show them that it is to their advantage to buy electric devices at an exclusive electrical shop, and that, as one of our dealers has said, they should not take their watch to a blacksmith to be repaired, but take it to a jeweler. They naturally would take it to a jeweler and we want to turn their thought, if possible, so that when they want a flat-iron or flashlight, that they will naturally patronize an electrical store instead of going to a department store or a drug store, where in a great number of instances, they will have inferior goods palmed off on them at cut prices, but which always prove more expensive in the long run.

As individuals, none of us feel that we could afford to start such a campaign, but we do feel that collectively and as members of the association we can not only afford it, but that good work can be done, and that results are bound to come of it.

Bear in mind, we are starting in on this in a small way, but we are starting, and we already have assurance of assistance from our San Francisco local and we are in hopes that we may receive more assistance from the jobbers, central stations and manufacturers who will naturally share in results from this campaign of education.

ROAD MACHINERY SUPERSEDES HAND LABOR.

Consul Homer Brett, at La Guaira, Venezuela, reports that the policy of the department of public works in its road building hitherto has been to use hand labor exclusively, so as to give employment to as many persons as possible; but recently a number of wheeled scrapers were bought in the United States, and after they had been tested officially it was announced that one man with a scraper accomplished the work of 20 men under the old methods.

ELECTRIC POWER FOR IRRIGATION PUMPING

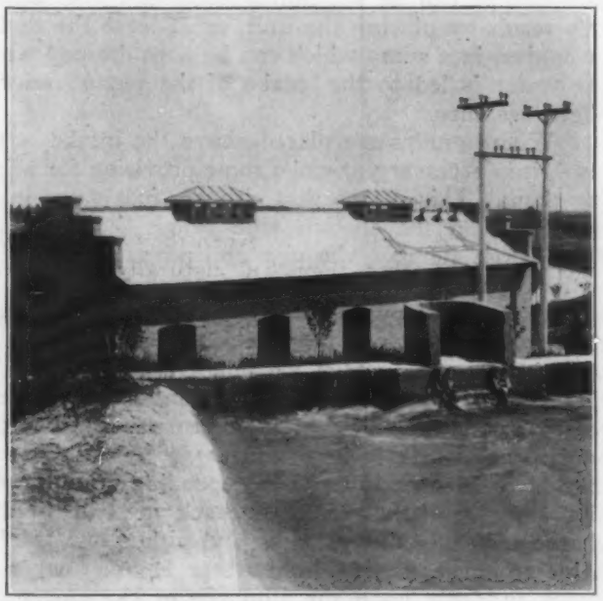
DEPARTMENT CONDUCTED BY S. T. HARDING

PUMPS FOR THE IRRIGATION OF SMALL AREAS.

BY BARRY DIBBLE.

(The author of this article is the electrical engineer in charge of the Minidoka project of the U. S. Reclamation Service in Idaho. Besides the main pumping units on this system which supply the largest single irrigation pumping project now operating in the United States, there are a number of small installations. The author's extensive experience in both the construction and operation of these developments give him unusual qualifications for discussing the subject. The article was prepared as a talk before the irrigation operation and maintenance conference held in Boise, Feb. 1916.—The Editor.)

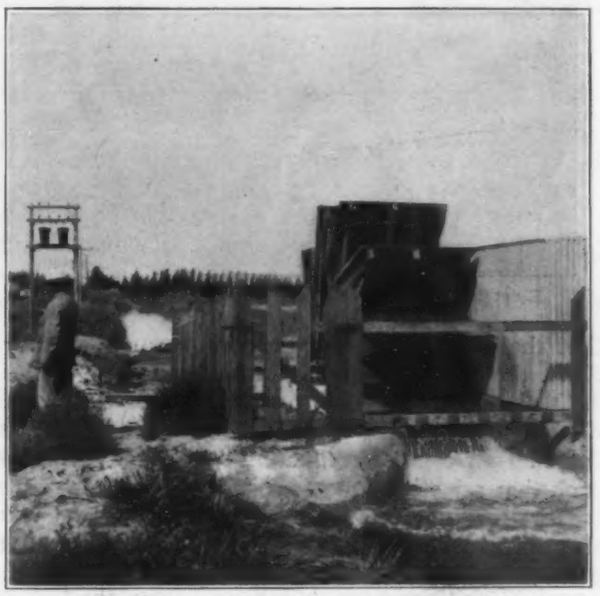
The most common type of pump for lifting irrigation water is the centrifugal. In principle this pump is extremely simple. It consists essentially of a revolving portion, or runner, into which water enters near the axis, and a casing or volute to catch the water leaving the runner and conduct it to the discharge pipe. The runner creates a velocity head in the water; in the casing the high velocity is reduced by a gradual increase in section and the velocity head is largely converted into pressure head.



Typical Power Installation for Small Pumping Plant.

The runner, rotating at high speed, throws the water it contains to its outer circumference by the action of centrifugal force. The faster the runner turns the greater the energy put into the water. The correct speed for a pump runner is closely related to the head or lift that it is required to pump against. Ordinarily the periphial speed should be about 1.20 or 1.25 times the spouting velocity ($V = \sqrt{2 g h}$) corresponding to the head, although this rule is subject to some variation on account of changes the designer may make in the curvature of the runner blades. This may be illustrated in other words by assuming an increase in the head on a given pump to four times it original height. Doubling the pump speed will then restore the proper working conditions.

The correct speed of a pump for a given lift is the speed at which it will operate at the highest efficiency. Important losses in a pump are shock and skin friction. Skin friction is a function of the velocity of the water through the pump and of the shape of the vanes. It can be largely avoided by carefully smoothing the surfaces of all water passages in the pump. At the best speed water should pass from the suction to the runner and from the runner to the casing in a smooth stream with few eddy currents and little shock. If the speed is higher or lower the shock and the eddies in the water increase and therefore the efficiency decreases. This means that, while running a pump above the correct point will increase the quantity of water discharged, the amount of power required to drive the pump will increase in greater proportion. For this reason it is poor economy to install a small cheap pump and have to run it at high speed when a somewhat larger pump, run at its correct speed will deliver the same amount of water with the expenditure of only a fraction of the power.



Current Wheel for Small Lifts.

If the speed is maintained constant and the lift, or head, is varied, the quantity of water varies. The curve that represents the relationship between head and quantity of water is known as the characteristic of the pump. Each centrifugal pump has its own characteristic curve. The designer has wide latitude in determining this characteristic and on it depends the suitability of the pump for any particular installation. There is a tendency to regard a six inch centrifugal pump as a six inch pump and practically equivalent to any other centrifugal pump of the same size, particularly to any other of the same make. This is entirely wrong and leads to many mistakes and much dissatisfaction. Stock and second hand pumps are a dangerous purchase for this reason, unless their characteristics are known and understood. Especially for a

permanent installation the conditions under which the pump is to operate should be carefully determined and proper allowance made for indefinite factors, so that the type of characteristic best adapted to the work can be selected. The saving in power alone will usually pay many times over for care at this point.

The writer has in mind a case where it was intended to install a pump in a well or caisson sunk below the water plane. As in many such cases, the amount of the drawdown was indefinite, as also were the fluctuations to be expected in the water plane. It was expected that the average lift would be about 55 ft. The pump furnished by the manufacturers came up to the requirements of efficiency and capacity at this lift, but on test at the factory it was discovered

Electrical Equipment for Typical Pumping Plant.

that the characteristic of the pump was such that at 57 ft. the pump would not raise any water, while at 35 ft. the pump would throw a stream of water nearly double that required and would overload the motor some 50 per cent. Fortunately the specifications were such that rejection followed. After some experimenting the manufacturers developed a runner and volute that gave even better results at 55 ft. lift, and the pump, as redesigned, would deliver a gradually diminishing stream up to 90 ft. At no point on the curve was more power required than at the lift for which it was designed. This condition was ideal for the location. It gave a pump that was little affected by fluctuations in the water surface and avoided any danger of burning out the motor should the water plane rise.

Where the pumps are designed to lift water to great height, the velocity with which the water leaves the pump runner becomes quite high and in such cases fixed diffusion vanes are sometimes put between the runner and the casing to catch the water as it leaves the pump runner and turn it without undue shock, so that it will enter the volute in a smooth stream. Centrifugal pumps fitted with these diffusion vanes are sometimes known as turbine pumps. In principle they are the same as the commoner type.

Of recent years there has been a great improvement in the design of centrifugal pumps and high efficiencies are now obtainable. It must not be supposed, however, that these high efficiencies are invariably secured in purchasing apparatus of this sort. There are many opportunities for losses in a centrifugal pump and many of these losses may occur, if the pump is not properly selected for the work which it is to do, if the specifications or the design are not properly drawn and carried out, or if the pump is not properly maintained. Shock and skin friction have already been mentioned.

Another frequently serious loss is due to the leakage of air into the suction pipe or through the glands of the pump shaft, when the pump is placed above the level of the water to be pumped. Where the suction lift is comparatively great this can be a controlling factor and the air leakage, due to poor packing, may be so excessive that the pump will not lift the water to the height of the runner. To overcome this difficulty it is desirable to set the pump in such a way that there will be no suction lift, but the pump runner will at all times be submerged. This can be done by using pumps with vertical shaft, and setting the entire pump below the water surface of the intake so that it will be submerged even when the water has gone down to the lowest level. It sometimes happens that pumps can be set horizontally and still secure this result by placing the unit, or at least the motor or engine, in a sump which can be kept drained while the water is led to the intake of the pump under a slight pressure.

Where pumps are placed above the intake water level, it is necessary to make some provision for priming them. This means that either a foot valve must be placed on the suction pipe below the pump so that, before starting, the pipe and pump can be filled with water, or a tight valve of some sort must be placed above the pump and means provided to extract the air from the pump and pipe, so that the water will rise into the partial vacuum created. Either of these methods introduce complications and additional losses. The loss in a foot valve is rarely less than the equivalent of 4 ft. in head and the writer has known it to be as high as 15 to 20 ft. depending upon the design and size of the valve. A check valve in the discharge also introduces losses and either one is also liable to cause trouble from water hammer when it closes suddenly upon the stoppage of the pump. A gate valve in the discharge may be used for priming, as may also a common flap valve placed on the end of the discharge pipe. The gate valve is usually quite expensive. The flap valve has the disadvantage of being a long way from the pump, so that it is necessary to remove a large amount of air before sufficient vacuum is created to cause the water to raise to the pump. If there are any leaks in the pipe further difficulty ensues. In a long pipe without an air vent there is danger of collapse when the pump stops. All in all, it is much better, where possible, to use submerged pumps and avoid these complications.

It will be appreciated that, while with a high lift the loss due to the foot valve or other fittings may be but a slight portion of the total head and may not materially affect the efficiency of the installation, if the head is very low the losses in valves and bends may amount to more than the total static head against which it is desired to pump the water and the percentage of loss will be correspondingly great. Power is

usually an important item in the operating cost and reasonable care should be exercised to improve the efficiency of the plant, in order to cut down the amount of power which will be required.

The centrifugal pump is adapted to many kinds of drive. Where available at a reasonable price, electrical power is undoubtedly preferable. Motors which can be directly connected to the shafts of either vertical or horizontal pumps may be obtained. This has the advantage of eliminating trouble and loss from belt and gears. The operation of electric motors is extremely simple and they are readily handled by unskilled labor. With gas engine drive it is usually necessary to belt the engine to the pump, providing clutches on tight and loose pulleys so that the engine may be started without having to turn the pump at the same time. With steam engines there is the additional complication of the boiler plant and the need of constant attendance, but the steam engine is less likely than the gas engine to be the cause of profanity on a cold morning.

If water power is available at a drop in a canal or stream it is sometimes feasible to connect a water turbine to the shaft on which the centrifugal pump is mounted, and use the fall to raise a portion of the water to a higher level. This makes a simple combination and one which should run long periods with little attention.

I need not mention the current wheels, which have for many years been used along western rivers to raise water in buckets attached to the circumference of the wheel for the irrigation of small areas. The Reclamation Service has adapted the old fashioned water wheel to pumping in another way, in what is called a scoop wheel. This is merely a breast wheel operated in the reverse direction and driven by an electric motor or other source of power. These wheels must, for best results, have a periphial velocity of only 3 or 4 ft. per second and it is therefore necessary to reduce the revolutions per minute from the motor to the wheel by large gears. The wheel carries paddles, which fit closely as they turn against the smooth concrete surfaces of the foundation. They dip into the water of the intake and raise it between the concrete walls discharging it breast high. The diameter of these wheels should be at least three times the height through which the water is to be lifted, and therefore the size becomes prohibitive above moderate lifts. However, this type of pump has a place for lifts of from 1 or 2 to 5 or 6 ft. High efficiencies are obtained. The wheels at present in service show a plant efficiency, including all motor and gear losses, of about 70 per cent. A 15 ft. wheel in installation operating with a 2½ ft. left has an efficiency of 85 per cent, for the wheel itself. A centrifugal pump of the same head and capacity would not be expected to have a plant efficiency greater than 15 or 20 per cent. For small quantities of water a wheel of this character can be driven by a treadmill or some other device operating with farm livestock, as the motive power. Stock used in this way would represent no investment for power, as during the time the owner is irrigating he would not be using his horses otherwise.

There are many other devices of one kind and another upon the market, which are from time to time advertised as great improvements in the art of pumping water. It may be that some of these are highly meritorious. Investigation, however, usually leads to the conviction that the owners of the patents are not anxious to submit their apparatus to test and that what machinery they have made is of inferior mechanical design and that the efficeincy is low. The market in which it is usually attempted to place these types of apparatus is that of the small farmer, who wishes to put in an inexpensive plant for irrigating a piece of high land. He is unable to see the fallacy in the theories advanced by the agent and frequently is victimized. The small owner is usually the man least able to carry out an experiment of this sort and obtain any advantage from it. It is much wiser for him to stick to standard machinery and standard methods of installation.

AN ENLARGED POWER PLANT FOR THE PANAMA CANAL.

Extensive changes have been authorized for increasing the capacity of the hydroelectric plant at Gatun, Panama Canal Zone. New turbine wheels have been ordered for the three turbogenerator sets, each of 400 h.p., instead of 3100 h.p., as at present. No change will be made in the generators, as the very liberal design of these units makes it possible to operate them with an output of 3650 kilovolt-amperes, at 80 per cent power-factor and 55 degrees C. temperature rise.

In order to take care of the increased output of these generators, four new 400,-000-circular-mill cables have been ordered for installation between the hydroelectric station and the Gatun substation. The present cables between these two points are 10 in number, and of No. 0000 size.

In addition, two 4000-kilovolt-ampere power transformers have been ordered for the Gatun substation. These are the largest transformers that can be installed in the existing compartments. There is now one vacant compartment for one of these transformers, and the other compartment will be provided by moving one of the present 2667-kilovolt-ampere units to the Cristobal substation, where it will be needed to take care of the increased load at that point, due to the operation of the new coaling plant, terminal piers, and the projected submarine base.

CHILEAN-BOLIVIAN OIL SYNDICATE.

A syndicate known as the "Sindicato Petrolifero del Oriente Boliviano" has been formed by Chilean capitalists to exploit an area of 545,000 hectares (1,345,-150 acres) of oil-bearing lands in eastern Bolivia. To carry on the work of exploitation as planned, subscriptions for approximately $10,000,000 are to be raised, chiefly from the nitrate producers in the north of Chile who are desirous of securing an independent and economical source of fuel.

EDITORIALS ON THE RAILWAY WAGE ISSUE.

The Association of Western Railways, for the information of the public, is sending out complete lists of editorials by the American press on the railway wage issue, which seem to favor that a settlement be forced either by the Interstate Commerce Commission or by arbitration.

PROSPECTIVE POWER MARKET FOR IRRIGATION PUMPING IN OREGON AND WASHINGTON.

BY JOSEPH JACOBS.

(Continued.)

Benton Project.—This project is located in the northerly end of Benton county, Washington, and it contemplates the irrigation of 109,000 acres of land lying above the Hanford project and below the area that is embraced in the proposed Yakima Valley Irrigation Project, a gravity and pumping scheme, as outlined in the King survey and report made for the Northern Pacific Railway Company in 1913. Pumpage is proposed to elevation 765 ft., which means a maximum lift, including friction losses of 362 ft. and a mean lift of 225 ft. from a pumping station located in Sec. 16, T. 13 N., R. 24 E., W. M. The cost estimate for project, omitting details, is made up as follows:

Pumping station complete	$ 883,000
Pressure mains	75,000
Main canals and distributiin system	3,410,000
Engineering and contingencies	874,000
Total	$5,242,000
Cost per acre for 109,000 irrigable acres	$ 48.09

It is true that the sandy character of the top soil and subsoil of this project will make for a low duty of water. Due weight was given to that factor in considering the feasibility of the project, and the above estimate was based upon the assumption of a delivery duty of 40 in. and a pumpage duty of 50 inches for an irrigation season extending from April 1 to October 15. It is true also that included within the boundaries of the project are some areas of sand dunes, but these latter have not been classed as irrigable lands and the project has been abruptly terminated at the southerly line of township 10, thereby excluding a large portion of them.

Despite the adverse criticism offered from time to time concerning this general Benton area, and despite the difficulties encountered by the Hanford Irrigation Company as to water duty and cost of pumpage, I am still impressed with the possibilities of this project and believe that an entirely practicable and economic development can be worked out for it on the basis of electric power pumpage. In the remaining Yakima River gravity supply, which can be made available by storage in the upper Yakima drainage basin, is to be applied to the bench lands above the Sunnyside canal and other nearer lands (and that appear to be its most economic application) then reclamation of the Benton area must depend on pumpage from the Columbia River, and every effort should be made to so reclaim it.

Alternative Power.—In connection with both the Priest Rapids and the Benton projects it is possible that local electric power may be developed and delivered at rates that could not be met by the Celilo development, with its necessarily long transmission line. Among these possibilities are Rock Island Rapids Cabinet Rapids and Priest Rapids on the Columbia River, all of which are in the proximate neighborhood of these irrigation projects. What these developments may cost and how they may compare economically with the proposed larger development at Celilo is not known, and I have therefore included the Priest Rapids and Benton projects as feasible even with power transmitted the long distance required from Celilo Falls.

Other Projects Included.—Among the lesser projects which are regarded as possible future users of Celilo power and special description of which are herein omitted, may be mentioned Grand Dalles, Roosevelt Flat, Beman Slope, Beverly, Arlington Gulch, Willows Slope, Blalock Island, numerous small areas between Miller and Arlington on the Oregon side of the Columbia and similar areas between Grand Dalles and Portland on both sides of the river which latter deserves an additional word for it differs in character from the other projects.

In the first place the district has an average annual precipitation of about 26 in. and in the second place its soils are somewhat heavier and less sandy than that of the irrigation projects further up the river and to the east of The Dalles. Unquestionably these soils are adapted to fruit and berries and vegetable culture and with the immediate proximity of Portland, which is bound to become a great metropolis, a permanent market is at hand for all that these favored areas could produce.

Although this district has an annual rainfall of 26 in. its rainfall during the summer months is only 4 in. and it is the deficiency of these months, a matter of from 12 in. to 15 in. for the entire season, which would need be made up by irrigation. The available are such as can be found in the vicinity of Mt. Pleasant, Butler, Cascades, Stevenson and Carson on north side of river and of Dodson, Warrendale and Cascade Locks on south side of river. Attractive benches are found here of from 100 acres to 1000 acres in etxent and at heights of from 50 to 500 ft. and upward above the river. Probably 10,000 acres could be thus developed and devoted to intensive culture and because the small amount of water to be pumped and the favorable market conditions would permit very high lifts.

Yakima Valley District.—The fall of the Yakima River is such that gravity irrigation may be employed for nearly all the lands available for irrigation in that valley. There are, however, some opportunities for pumpage from wells, as for instance in the Moxee District, but so small an amount of power as required for such restricted areas could not be economically transmitted that distance and they could be more economically and more reliably served from local sources There are also some larger possibilities of pumpage from canals to the bench lands above existing and proposed gravity canals. Cases in point are tracts above the existing Sunnyside Canal and above the proposed Wapato Project canals.

It seems possible, however, to serve all such tracts by direct hydraulic lift or by electric power derived from developments at drops in the gravity canals themselves and at costs below that at which Celilo power could be delivered. This feature is very well covered in the King Survey and report on the Yakima Valley Irrigation Project, already referred to, which shows an estimated cost of about $41 per acre for the entire project embracing about 149,000 acres of gravity lands and 48,000 acres of pump lands.

Kennewick-Hover Slope.—This is a very attractive tract of bench land embracing about 10,000 acres to an elevation of about 300 ft. above the Columbia River. These lands lie above the Northern Pacific Irrigation Company Canal, which is also a partial pumping scheme deriving its pumpage water from a main gravity canal which heads on the Yakima River.

Below the N. P. I. Company canal there appears to be about 2500 acres having no water right and which could be readily served by pumping from wells with lifts varying from 25 to 50 ft. I have, however, disregarded all of these possible developments by reason of the fact that the proposed Yakima Valley Irrigation Project can serve the same areas by gravity and pumpage incidental thereto at a lesser cost than is possible by pumping from wells or from the Columbia River.

Snake River District.—Snake River throughout the 130 miles of its course from Clarkston to Pasco is confined between canon walls which rise from 500 ft. to 1000 ft. above the river. Some excellent bodies of land are found on these upper benches but they are generally too high to be served economically by pumpage from the river. Immediately along the river shore, however, numerous small flats and low benches are found which are of high fertility as demonstrated by existing farms and which, in the aggregate, amount to about 2000 irrigable acres between Pasco and Riparia and to about 1500 irrigable acres between Riparia and Clarkston, exclusive of the broad area which opens out immediately at Clarkston.

Many of the flats are already in cultivation, particularly in the section between Riparia and Clarkston, both fruit and forage culture being highly successful. Pumpage is by gasoline engine plants the lifts varying from 50 to 100 ft. For the areas above stated, lifts from 50 ft. to 150 ft. would obtain and for an average lift of 100 ft. it would appear that not to exceed 600 h.p. of electric energy would be required for the section Pasco to Riparia, nor more than 400 h.p. for the section Riparia to Clarkston.

To transmit so small an amount of power from the nearest prospective substation, to wit: the pumping plant of the proposed Three Rivers Slope Project in Section 2, T. 9 N., R. 32 E., would necessitate power rates for pumpage of from 0.80 cents to $1.50 per kw.-hr. It is believed that these rates could not compete with power rates which might obtain from local sources i.e., by the use of internal combustion engines, by power which may be developed on the Snake River itself or, for at least the upper sections, by power derivable from Lewiston. For these reasons the Snake River Valley has not been included as a probable market for Celilo power for irrigation pumpage purposes, except at its mouth where the Three Rivers Slope scheme has been included.

Walla Walla District.—There is a small amount of irrigation pumping from shallow wells in this district at the present time, and there is a possibility of its extension. In the district lying immediately south of Walla Walla and on towards Milton and Freewater in Oregon there is a possibility of about 5000 acres being reclaimed by pumpage from shallow wells with lifts varying from 10 ft. to 60 ft., which, in the aggregate, might require about 500 h.p. of electric energy. I have estimated that so small an amount of power would not warrant the construction of a transmission mercial service, the cost of power so delivered would be in excess of what such power might be supplied at from other sources.

Central Oregon.—As referred to in the initial section of this report, familiarity with this region from investigations previously made relieved the necessity for its detailed field examination at this time. However, some examinations were made to ascertain ground water conditions in the district about Pendleton, the result of which was adverse to there being any sufficiency of water for irrigation purposes from that source in that locality. Water is found in wells at depths of from 100 ft. to 400 ft. and while these wells are regarded locally as of good yield for stock purposes and domestic use they are apparently quite inadequate for irrigation.

In Central Oregon proper, however, some pumpage possibilities are known to exist, although these are not extensive, as pointed out in a report rendered by the writer in 1909 to the United States Reclamation Service entitled "Central Oregon Investigations—Irrigation Possibilities." Among those areas which would seem to offer pumpage possibilities may be mentioned the great Harney Valley with its 400,000 acres or more of good irrigable land, the Warner Lake and Silver Lake districts in Lake county, and that extensive territory lying between Rock Fort and Christmas Lake generally referred to as the Fort Rock Desert and embracing some 80,000 acres of excellent land. In all of these districts ground water is found at depths varying from 5 ft. to 40 ft., and the situation for pumpage would be inviting if only the water supply could be proven adequate as to quality and quantity.

Of the 400,000 acres of irrigable lands in the Harney Valley perhaps one-half can be served by gravity supplies from Silvies River, Silver Creek and Donner and Blitzen River. As to pumpage from wells from the remaining area I stated as follows in my report of 1909:

> **"Ground water as revealed by numerous wells is found at depths of from 6 ft. to 20 ft. These wells are used solely for domestic and stock purposes and no evidence is at hand as to whether their quality or quantity would permit their general use for irrigation. I have no doubt they are suitable as to quality but believe they would fail as to quantity. Prof. Russel of the U. S. Geological Survey expresses a strong conviction that there is an artesian supply of water underlying this area but this has not yet been demonstrated by the actual sinking of a well, though one unsuccessful effort was made in this direction."**

I see no present reason for changing the general opinion then expressed, though it should be added that a more or less restricted area can and no doubt will ultimately be reclaimed by pumpage, for the gravity irrigation supplies brought in will tend to augment the normal ground waters available for pumpage.

In the Fort Rock District the ground water conditions are also of uncertain dependability as regards irrigation. Although the district embraces some 80,000 acres I believe that not to exceed 25,000 acres can ultimately be reclaimed by pumpage from ground water supplies. In reference to the same area Mr. Gerald A. Waring, in Water Supper Paper 220 of the U. S. Geological Survey, after expressing doubt as to the sufficiency of the ground water supply, expressed himself as follows:

> **"The quality of the sub-surface water should also be taken into account in considering its prospective use for irrigation, for it is all alkaline, at least all of the shallower water, which is all that has so far developed, and although perhaps its use for the first few years would not be noticeably injurious to crops, its continued use, if not carefully managed, could not fail to be."**

(To be continued.)

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Hetch Hetchy—Stop, Look, Listen!

It is not the purpose of this editorial to take sides on the relative merits of the Hetch Hetchy project as opposed to other possible schemes of development. Nor it is the purpose to favor any present water or power company supplying San Francisco with these vital necessities of life, nor yet to add our mite in assisting those endeavoring to wrest from these corporations their present functions of public usefulness and make them city-owned. Rather is it our purpose to briefly call attention to an issue that the Hetch Hetchy, in its entirety, presents—an issue so far reaching in its magnitude as to shake the very foundation stones upon which future growth and development of the prosperity of California must ultimately rest.

At the outset, it must be admitted that four features of western life have been responsible for the gigantic commercial growth of that prosperous empire—namely salubrious climate surrounded by scenic beauty, fertility of the soil, cheap water power and abundant water for irrigation.

Much has been said as to the possible destruction of the scenic charms of the beautiful Hetch Hetchy Valley by the construction of the proposed San Francisco scheme of development. Go upon the ground yourself and you can not but admit that the Almighty in his wisdom has there created a thing of beauty. Yet this self-same beauty is combined with a marvelous utility, in the bounteous provision that has here been made to supply to man in abundance the very necessities so needed in the great commonwealth of California—power for her industries and water for her thirsty citizens and her barren lands. Indeed so bounteous is this provision that the usefulness of this gigantic reservoir is of such economic importance as to far outweigh any other consideration. Again when one visits the Hetch Hetchy this season and travels over the wonderful scenic road of compact granite already completed into the valley, one can not but realize that ultimately the great natural scenic beauty will be enhanced and become of far more accessibility to the average American beauty lover than formerly was possible.

So the real issue narrows down to reservoiring and diverting these waters in order that the greatest good may result to the greatest number of people.

The diverting of these waters to San Francisco will unquestionably result in supplying that city with sufficient water and power that will be ample for a future growth reckoned in the millions. Its diversion, however, does call into question important economic factors that cannot and must not be overlooked. Indeed, factors of such importance that only the strictest impartiality can decide, an impartiality that looks not to power interest, community interest, nor special privilege, but fundamentally to the full and harmonious development of all the state's resources so as to benefit all to the full extent of their development—not

twenty years from now—but throughout all posterity. For water in California may be likened to the "bold peasantry" described in Goldsmith's Deserted Village, when he said: "Princes and lords may flourish or may fade, but a bold peasantry, when once destroyed, can never be supplied."

It is not too late, by any means, for the citizens of California to rise and see that this entire project receives a hearing, so impartial, so all-searching in its investigations as to allay forever any possible regrets that may arise in the future.

San Francisco and her own citizens are themselves more vitally interested than any others. Destined to become perhaps the greatest business center of the growing pacific, her fruit laden ships, her boasted bank clearings, her towering commercial palaces must depend upon the prosperity and development of the great interior basins of California.

The issue is a stupendous one and one well worthy the most serious thought and investigation—one indeed that the entire West will watch with keenest interest.

Then let the people rise and give the Hetch Hetchy and other possible water supply sources for San Francisco such an impartial hearing that posterity may see how truly we loved them when our children's children come to review the wisdom with which we directed the harmonious development of the water resources of a great commonwealth.

And if it proves by impartial investigation that the present proposed Hetch Hetchy Development does not meet with the harmonious development of the state's resources let the project be abandoned for the one that will. If, on the other hand, such investigation proves the Hetch Hetchy Project to be in full keeping with the best development for all concerned, then let opposition forever hold its peace and let all give to the project that cordial and helpful support that is commensurate with its brilliancy and daring.

Price Advice

Since price fixing has rightly been tabooed by the Sherman anti-trust act, a demand has arisen for intelligent advise as to what price will yield a fair profit to the average electrical contractor and dealer. The catalogue or list price is usually somewhat greater than need be charged, whereas, in figuring a selling price based on his cost, a dealer is likely to overlook such items as overhead, frequency of turnover and legitimate profit. Price advice is needed.

To meet this need, it is planned to regularly publish in these columns a price index. This list is to be published on our own responsibility and is merely suggestive of what experience has shown to be a proper price to be charged. This list will be concerned primarily with materials used in electrical construction, wire, conduit, sockets and such. Under present conditions cost prices change frequently, so that it is well for the contractor to provide for as frequent a change in selling price.

The first installment of this price series appears in this issue, being arranged for easy removal and filing. After the series has been completed, corrected sheets will be published regularly.

These price suggestions are prepared to meet the practical requirements of the electrical contractor. Their value is self-evident. Suggestions as to means for bettering the service will be appreciated by the editors. The idea is to help stabilize the electrical business by helping the men who constitute the foundation of the industry—the electrical contractor.

A Suggestion for Action

The next step in the upbuilding and strengthening of the electrical industry in the West should be the formation of a strong association embracing all interests within the one common interest of locality. The central station, the engineer, the jobber and the contractor-dealer, no matter how diverse their several activities, have the one common problem of stimulating the electrical habit among the Western people. While national associations are well adapted to studying the general questions affecting each branch of the industry, the local association is needed to co-ordinate and apply the remedies suggested.

The electric range will suffice as a concrete example. The general electrical cooking situation was most ably discussed last June by the National Electric Light Association. The sales features have been considered by the National Electrical Supply Jobbers' Association and installation methods are being investigated by the National Electrical Contractors' Association. But concerted local action is necessary on the part of the central station, jobber and contractor dealer to interest the consumer and sell the ranges in each section of the country.

The full measure of benefits to be derived from extensive centralization can be obtained only by intensive sectionalization of effort. Each locality has peculiar conditions which can best be overcome by those most closely in contact with them.

A start in this direction has already been made by the Pacific Coast electrical jobbers in inviting representatives of the manufacturers and central stations to meet with them. The contractors, likewise, are welcoming these several interests at their meetings. One of the most important matters discussed at the meeting of the California Association of Electrical Contractors and Dealers last week was the formation of a Pacific Coast association. Delegates from both the Washington and Oregon associations were in attendance and plans were made for knitting the organization more closely together.

Among these several get-together movements it is greatly to be hoped that an amalgamation will be effected. Each can help the others and in their united effort can advance the prosperity of all. The jobber is in a position to teach better sales methods. The contractor can create a more favorable public opinion. The central station can co-operate to its own advantage with all other interests. Localization of effort makes for a more efficient activity.

PERSONALS

Geo. L. Dillman, consulting engineer at San Francisco, is in Idaho.

O. B. Penrose, sales manager Fobes Supply Company of Portland, is at Oakland, Cal.

B. M. Levy, manager Great Western Power Company at Santa Rosa, was at San Francisco this week.

Ed. Whaley, secretary Northern California Power Company, is spending his vacation in Trinity County, Cal.

F. G. Baum, consulting engineer at San Francisco, is expected to return this week from a visit to his ranch.

R. Tomlinson, of Pierce-Tomlinson Co., has returned to Portland after attending the electrical contractors' convention.

Arthur Mathews, manager of the Nevada, California & Oregon Telephone Company, is at San Francisco from Reno.

F. S. Mills, engineer with National X-Ray Reflector Company, has opened an office in the Rialto Building, San Francisco.

T. W. Simpson, Pacific Coast manager Federal Sign System (Electric), is attending a branch managers' meeting at Chicago.

John Coffee Hays and **H. Y. Hall,** consulting engineers at San Francisco, are attending the military training camp at Monterey.

C. A. Malone, purchasing agent California-Oregon Power Company, with headquarters at San Francisco, is at Fort Stevens, Ore.

H. A. Laidlaw, electrical engineer with the operation and maintenance department of the Pacific Gas and Electric Company, is at Lake Spaulding.

H. L. Tinling, electrical contractor of Spokane, has returned home from the contractors' meeting at Stockton, where he represented the Washington Association.

E. D. Pike, manager of the Pacific Coast Service Department of the Wagner Electric Mfg. Company has returned to San Francisco from a business trip to Los Angeles.

W. D. Kohlwey, owner of the Kohlwey Light Company of San Francisco, is at New York City, as a delegate to the convention of the National Electrical Contractors' Association.

G. F. Wakeman of the Edison Storage Battery Company, is expected to return to San Francisco this week after a three months' trip through the northwest and the intermountain country.

Geo. R. Murphy, Pacific Coast manager Electric Storage Company, will remove his offices from the Rialto Building to a general service station in Van Ness avenue, San Francisco, about the first of August.

F. W. Hild, vice-president and general manager of the Denver Tramways Company, is visiting at Portland on business. Mr. Hild was formerly general manager of the Portland Railway, Light & Power Company.

H. P. Munger, Pacific Coast manager Hughes Electrical Company, has returned to his headquarters at Salt Lake, after an extended trip to Portland, Seattle, Spokane and Boise. While in Portland he sold one of the largest apartment houses a complete electric range installation.

Attilia Norman, vice-president and general manager of the Oregon Power Company, has resigned. His successor will be appointed by Mr. Elmer Dover, president of the Northern Idaho & Montana Power Company and president of its subsidiary, the Oregon Power Company, with headquarters at Tacoma, Washington.

Rudolph W. Van Norden consulting engineer at San Francisco announces that a new hydroelectric generating plant which he has designed and installed at Folsom Prison, Cal., for the State of California, has been placed in operation. This plant is interesting from the fact that it is the lowest head installation on the Pacific Coast, the normal operating head being about 8 ft. The plant is in two units with a total rated capacity of 400 kw. While this is a comparatively small installation, the generators and turbines, due to the exceedingly low head and slow speed are very large and heavy. The turbine runners measure over 7 ft. in diameter and stand 5 ft. high, and each weighs 8000 lb.

OBITUARY.

William A. McGovern, general manager of the Northern Electric Railway Company, died suddenly Saturday evening July 15, 1916, at his cottage on Lake Tahoe, where he had gone for a short vacation with his sister and daughter. Death was due to heart disease. Mr. McGovern was dancing on the bay pier with relatives and friends. After an evening of recreation he said goodnight at 10 o'clock and left for his room. Twenty minutes later his sister went to the room and found him lying on the floor unconscious. The body was taken to Berkeley, where the funeral was held.

MEETING NOTICES.

San Francisco Electrical Development and Jovian League.

A special meeting was held July 12th to complete arrangements for participation in the preparedness parade on July 22nd. Chairman A. E. Drendell announced that the electrical division would probably have 3000 men in line. T. E. Collins was appointed marshal in charge. Resolutions of sympathy were also adopted with reference to the death of J. Harry Pieper of Los Angeles.

Great Western Power N. E. L. A. Section.

The regular monthly meeting of the Great Western Power Company Section of the National Electric Light Association was held at the Hotel Washington, San Francisco, July 10, 1916, with an attendance of 75. E. A. Wilcox presided at the meeting, which was addressed by A. L. Lerch, of the American District Steam Heating Company, and J. K. Fairchild, secretary of the section, who spoke on "Financing of Municipal Enterprises."

TRADE NOTE.

Crocker-Wheeler Company announce that on or about July 22nd they will move their present offices to larger quarters on the ground floor of the Crossley Building, No. 87 New Montgomery street, and will, as heretofore, carry a large stock of motors for immediate shipment.

NEWS OF CALIFORNIA RAILROAD COMMISSION.

The commission has issued an order granting the San Joaquin Light & Power Corporation permission to issue $666,500 of first and refunding mortgage series "C" six per cent gold bonds at not less than 96 per cent of their face value and accrued interest. The proceeds from these bonds is to reimburse treasury for additions and betterments already made, and for purchase of transformers.

The commission issued an order granting authority to the Central California Gas Company to issue $7000 of bonds and $30,000 of stock.

Oro Electric Corporation and subsidiary companies have applied to the commission for authority to sell their public utility properties to the Pacific Gas & Electric Company. The purchasing company seeks authority to issue $1,755,000 of its general and refunding mortgage gold bonds at 85 to reimburse its treasury in the amount of $1,491,151.35 expended to acquire $1,830,000 face value of bonds of the Oro Electric Corporation. Under the agreement of sale the Pacific Gas & Electric Company is to purchase at 92½ plus accrued interest $670,000 face value of Dredging Company bonds, the proceeds to be used to redeem the bonded indebtedness of Oro Water, Light & Power Company and Oroville Light & Power Company and to pay the floating indebtedness of Oro Electric Corporation and subsidiary companies.

CALIFORNA ELECTRICAL CONTRACTORS' CONVENTION.

The seventh annual convention of the California Association of Electrical Contractors and Dealers was held at Stockton, July 14-16 with an attendance of nearly 200. The convention was without doubt the most successful yet held, not only in point of attendance but also as regards action taken; particularly noteworthy was the representation of central stations as well as of jobbers and manufacturers. Preliminary plans were made for a Pacific Coast Association of Contractors, with the possibility of united action by the other interests.

The convention was called to order Friday morning by President C. V. Schneider. After a few preliminary remarks, Mr. Schneider introduced Mayor A. C. Oullahan, who heartily welcomed the electrical men to Stockton. After fitting reply had been given by A. H. Elliott, President Schneider presented his annual report. This briefly summarized the progress of the association during the past three years, during which period Mr. Schneider has successively and successfully served as president. With all modesty he ascribed credit for this success to the assistance of the various committees and officers. He told of the re-organization of the association and of its co-operation with the jobbers and central station, laying particular stress on the benefits gained from these harmonious arrangements. He showed how the idea had recently spread, not only on the Coast but throughout the East. The close affiliation with the central station has lead to recognition of the contractors' rights as regards the maintenance of retail prices, as well as a clear field in house wiring. Future indications, in the mind of President Schneider, are most hopeful for a more general prosperity throughout the electrical industry.

In the afternoon a short business session preceded a joint meeting between the jobbers, contractors and central station representatives. At this meeting a new district consisting of Marin, Sonoma, Napa, Mendocino and Humboldt counties was formed and San Mateo county was added to the San Francisco District. Strong endorsement was given the idea of an inter-state conference board, preliminary to forming a Pacific Coast Electrical Contractors' Association. Not only was the idea backed in person by the representatives of the Oregon and Washington Associations, but telegrams were also received from the British Columbia Association saying that any movement welding together similar associations on the Pacific Coast would receive their support.

While these business matters were being discussed by the contractors the ladies in attendance conducted a card tournament.

The joint meeting of the contractors, jobbers and central stations was held under the chairmanship of L. P. Gilpin. At this meeting, addresses were made by Mr. C. F. Butte, representing the San Francisco contractors, M. L. Scobey, representing the San Francisco dealers; N. Ellis, representing the Oakland contractors; C. E. Arbogast, representing the Los Angeles contractors, J. R. Tomlinson, representing Oregon; H. L. Tinling, representing Washington; S. V. Walton, E. A. Wilcox and Samuel Kahn, representing the central stations, and W. L. Goodwin and W. S. Berry, representing the electrical jobbers.

In the evening an informal dinner dansant was held on the roof garden of the Hotel Stockton, which was greatly enjoyed by all present.

Saturday morning was devoted to unfinished business and to the election of officers. Under the head of the former was included a report by J. Gensler, regarding the organization and general conditions of Oakland. C. F. Butte, as chairman of the Telephone Specifications Committee, presented a report and recommendations that efforts be put forth to retain telephone installations as part of the contractors' work rather than have this work done by the telephone company. H. C. Reid presented a report of the Standardization Committee particularly as regards the work in connection with the Industrial Accident Commission of California. Frank Somers reported full and favorable co-operation from the power companies with the association.

The election of officers resulted in Mr. F. J. Somers of San Jose being made president for the ensuing year with the following vice-presidents in charge at their respective districts: H. C. Reid and M. L. Scobey, San Francisco; N. F. Nagle and J. Gensler, Oakland; L. F. Youdall, Stockton; C. V. Schneider, Sacramento; W. E. Hayes, Santa Rosa.

Co-Operation with the Central Station.

On Saturday afternoon a most intersting open meeting was held. This started with an address by Mr. Samuel Kahn, manager of the Western States Gas & Electric Company, who spoke of the development of co-operation between the central station and the contractor-dealer. He said in part: "A tug-of-war between common interests is not co-operation. The weak are vanquished—the victors are left in a state of exhaustion. To pull is effort and effort expanded in the right direction is useful and results in achievement to a greater or less degree. The modern principles of good business demand co-operation for the good of the service and the greater the co-operation the bigger and better the rewards." He defined the first step toward co-operation as acquaintanceship, which stops unjust criticism, the second, as local organization, which brings unity of thought and action in solving local problems, and the third as general organization, which handles the larger and more general problems. After tracing the early history of central stations, which originally chose to do certain sales and construction work until the contractors had proved their ability, he showed how these campaigns of education eventually benefited the dealer. He stated that the central stations will abandon the electric ranges, for example, after this period of education has been passed. In his opinion the lighting uses of electricity are becoming secondary to the power service and that every additional application means greater work for all.

Development of the Electrical Organization.

Mr. W. L. Goodwin then spoke at length of the development and growth of the eletcrical organization. He stated that the present movement had its inception two years ago last November, at a time when the electrical business was in a most deplorable condition. The central stations were being attacked by municipal ownership demagogues, manufacturers and jobbers were being attacked by governmental agencies and dealers were suffering from poor business conditions. Previous organizations of the contractors, said Mr. Goodwin, had been based largely on the principle of fixing prices. As this was prohibited by the Sherman Law, which, incidentally, made no provision for the continuance of such associations, considering only their evils, it was at first thought the association must disband. Yet really, price fixing proved to be the least of the work that could be accomplished by associations. These conditions applied to all associations throughout the country. As regards the Association of Electrical Jobbers, Judge Debervoise met with representatives of the Department of Justice and explained to them so ably the purpose of the jobbers in educating their membership that he had no difficulty in persuading them of the justice of such an association.

After two years of successful effort, the jobbers concluded that a similar organization would help the retailer. The retailers were somewhat doubtful at first as to the benefits accruing from purely educational work but finally saw the necessity for such an organization.

The electrical retailers are recruited from the ranks either of young engineers or mechanics, both of whom lack business training. They are greatly in need of development along commercial lines. They do not understand that profit is essential

to business. Yet the government cannot afford to have business men in business unless they made a profit and so it is natural that the government should encourage any association which will teach men how profits may be made.

Each interest, that is, the manufacturer, central station, contractor and jobber, had separate organizations, whose activities were confined largely to their own problems. They were continually, though unintentionally, fighting each other. By seeing their common interest they were brought to a common ground and the movement, as started in Central California, has grown to be a strong organization.

A similar organization in Southern California is most prosperous and recently like associations have been formed in Washington, Oregon and British Columbia. As a result of this work, central stations that formerly thought it right to merchandise electrical devices at cost have been educated to the idea that there are other men in the industry whose prosperity reflects prosperity on the central station interests. By allowing profit to the other men they are enabled to make more profit themselves.

Manufacturers, likewise, have ceased to be so aggressive in the field at the expense of others. The jobber also has established a code of ethics intended to protect and help the other man. While the conditions are not yet perfect they show a great improvement and the movement will undoubtedly grow as it gains the support and confidence of the Federal Trade Commission.

After briefly explaining the reason for his earnest endeavors in this connection, Mr. Goodwin showed how the attitude of the Federal Trade Commission has changed as it has become better acquainted with the purpose of the trade association. Whereas formerly their remarks were confined to cost accounting, recently they have laid great stress on the value of organizations of business men for educational purposes. He concluded his address by reading a portion of Chairman E. N. Hurley's recent speech before the Associated Advertising Clubs of the World, which proves the strong endorsement which has been given the association movement by the government:—

The Federal Trade Commission is endeavoring today to work out a comprehensive, constructive solution of our business problems. We have taken definite steps toward getting at the real facts of industry from manufacturers. Within a few months we hope to be able to give manufacturers first-hand detailed information about their business.

The activities of trade associations and similar business organizations are manifold. Groups of associated business men that are putting forth special efforts to improve systems of cost accounting, bettering their processes of manufacture, standardizing their output, obtaining credit information, and endeavoring to advance the welfare of their employees, are bound to be most important factors in our country's development in the course of the next few years.

Special commendation should be given to associations that are endeavoring to build up industries in these constructive ways. Successful production and successful merchandising require many steps in the process of changing the form of the raw materials and putting the product on the market at a figure adequate to cover the cost of production and the cost of selling and net some profit to the producer, without charging the consumer an excessive price; and neither the individual manufacturer nor the Government alone can work out the many serious economic and business problems involved so successfully as can a group of associated producers or merchants laboring together in co-operation. These associations, when conducted intelligently and rationally, with the thought of bringing about improved business conditions, will make it possible for our industries to compete in price and quality in the markets of the world.

There should be a greater degree of organization and of mutual helpfulness in all lines of trade and industry, so that American business may be welded into a commercial and industrial whole, the part of the Government being to co-operate with business men, on request, to bring about the results that will benefit business and hence promote our national welfare.

President Wilson's views on trade associations may be of particular interest to you. In a letter addressed to me, under date of May 12, 1916, he said, in part:

The White House,
Washington, May 12, 1916.

. . . . . .

Your suggestion that trade associations, associations of retail and wholesale merchants, commercial clubs, boards of trade, manufacturers' associations, credit associations, and other similar organizations should be encouraged in every feasible way by the Government seems to me a very wise one. To furnish them with data and comprehensive information in order that they may more easily accomplish the result that they are organized for is a proper and useful Government function. These associations, when organized for the purpose of improving conditions in their particular industry, such as unifying cost accounting and bookkeeping methods, standardizing products and processes of manufacture, should meet with the approval of every man interested in the business progress of the country. . . .

It is my hope that, in addition to the other work which the Federal Trade Commission is doing, it will ascertain the facts regarding conditions in our various industries. If it finds that an industry is not healthy, it should, after carefully considering the facts, in co-operation with the parties interested, suggest a practical and helpful remedy. In this way many of our difficult business problems might be solved.

I am very anxious to see you continue to co-operate with the business men of the country along the lines upon which you are working.

Cordially and sincerely yours,
WOODROW WILSON.

Governmental Co-Operation.

Harris J. Weinstock, California State Market Director, then gave an excellent address on Government Co-Operation with Association Work, which he humorously defined as making for "an improved order of white men." He stated that the lack of standard has caused much unnecessary suffering among the industries. The way to establish standards is through organization. He illustrated this by the work being accomplished by the State Market Commission, which was created in order that the producer get a better price for his product without any hardship to the consumer.

Mr. Weinstock then refuted several criticisms which had been directed against this plan, the first being the question of special legislation for the farmer. He showed that all other lines of business have been helped by special legislation and that the farmer is the last to be aided. Answering a criticism that this was socialism, he explained that socialism no longer stands for everything that is evil and vicious; while its objective is visionary and unobtainable, yet it is advocating many wise and beneficient things which we should be prudent enough to adopt. He stated that the postal service is socialistic, that public schools, public highways, county hospitals, are undertakings by the people for the people without profit.

In answering the objection that this also was paternalism, he showed that paternalism is of two kinds—that which helps and that which hurts.

Replying to the criticism that this was but another political machine, he argued that through the medium of the nominating primary the day of the political boss had passed and bribery had been eliminated. He cited the success of the state-managed accident insurance commission and also the building of public highways in California and was of the belief that it was perfectly safe to invite a political commission to handle the matter.

Trade Acceptances.

Mr. Russell Lowry, president of the First National Bank of Oakland, then spoke on Trade Acceptances. He explained that the present system of open book accounts has come into general use in America only since the Civil War. Previously, notes at hand or acceptance drafts were in general use. After the war, many of the old firms had gone out of

business and new firms of unknown credit standing had come into the field. In order to do business with them, the jobbers offered cash discounts which have since brought an attendant train of evils. These abuses include the unjust advantage given to one who can pay cash, he thus really getting a rebate or price differential and so working hardships on the man with limited capital. In practice, the expiration date has not been rigidly insisted upon and a most slipshod and careless method of meeting obligations has ensued. A return to the old method should make people more careful in assuming obligations and should give the merchant and manufacturer access to new reservoirs of capital.

The trade acceptance is a negotiable instrument which offers prima facie evidence of a transaction, whereas the open account is merely a memorandum which may be repudiated by the buyer.

To the jobber and manufacturer it has three advantages: (1) it gives legal evidence of the correctness of a bill and the date on which it is to be paid, (2) it is discountable at more favorable terms and (3) jobber can obtain a larger and cheaper credit and thus require smaller capital.

The banker considers it superior to a promissory note, which gives no record as to the purpose of the loan, whereas the trade acceptance defines the obligation, is self-liquidating and likely to be paid at maturity. It has been used almost exclusively in Europe for many years and has proven most satisfactory.

To the retailer, also, it offers the advantage of better service from the jobber without increase in cost. If bills are not paid promptly the jobber is compelled to minimize his selling service. It will also prevent overstocking and lead to more careful and thorough collections.

Mr. Lowry doubts whether the trade acceptance should be sought from the ultimate consumer, primarily because of the vital difference between the credit to the consumer and the credit to the retailer. When the jobber extends credit to the retailer it is a productive credit, when the retailer extends credit to the consumer it is a consumptive credit. Furthermore the retailer sells in small quantities and to a large number of people and in the majority of cases will find that the trade acceptance merely amounts to giving a more extended term of credit than with the present method of doing business. In conclusion, Mr. Lowry dwelt on the larger aspects of the situation in benefiting the business man by providing reservoirs of commercial credit. With the trade acceptance, a commercial bank can extend greater credit with the utmost freedom. It, in a measure represents a sacrifice all along the line for the general welfare.

A. E. Drendell then gave a brief account of the plans for the Preparedness Parade on July 22d and urged all possible to participate therein. Closing remarks were made by Albert H. Elliott and the convention adjourned.

Banquet and Picnic.

Saturday evening one hundred and sixty members and guests sat down to a fine banquet, where F. H. Somers, president-elect, acted as toastmaster. Mrs. Schneider, the wife of the retiring president, was presented with a handsome silver tea-service and talks were made by A. H. Elliott and H. C. Reid. The dinner was interspersed with pleasing entertainment features and at its conclusion dancing was indulged in to a late hour. On Sunday a trip was taken down the river to a pleasant picnic ground where all enjoyed a little relaxation after the more arduous duties of the business sessions had been concluded.

The arrangements for the convention were made by a general committee, consisting of M. A. De Lew, San Francisco, chairman; C. V. Schneider, Sacramento; H. C. Reid, San Francisco; M. F. Nagle, Oakland; L. B. Gilpin, Oakland; F. J. Somers, San Jose; L. F. Youdall, Stockton.

Ways and Means Committee: C. F. Butte, W. D. Kohlway, G. Sittman, Geo. J. King, L. F. Youdall, T. Scott, W. E. Hayes.

Program: H. C. Reid, G. I. Kenny, N. M. Hope, P. L. Bennett.

Entertainment: A. F. Flanagan, M. L. Scobey, H. S. Tittle, Mrs. A. F. Flanagan, Mrs. M. A. De Lew, Mrs. C. V. Schneider.

Reception: Mr. and Mrs. A. F. Flanagan, Mr. and Mrs. J. Gensler, Mr. and Mrs. C. B. Kenny, Mr. and Mrs. W. D. Kohlwey, Mr. and Mrs. F. H .Somers.

The following registered at the meetings:

Contractors.

L. J. Bennett.
G. H. Andrews, Oakland.
G. E. Arbogast, Los Angeles.
C. D. Bass and wife, Stockton.
W. A. Blair, San Francisco.
Geo. W. Brouillet and wife, San Francisco.
C. F. Butte and wife, San Francisco.
A. E. Commerford, Stockton.
C. L. Chamblin, San Francisco.
H. H Courtright, Fresno.
M. A. De Lew and wife, San Francisco.
N. P. Ellis, Oakland.
P. Decker and wife, San Francisco.
E. E. Elza, Fresno.
C. J. Franke and wife, Stockton.
A. F. Flanagan, Stockton.
J. Gensler and wife, Oakland.
C. O. Gould and wife, Stockton.
F. J. Greisberg, San Francisco.
L. P. Gilpin, Oakland.
G. S. Haller, San Francisco.
W. E. Hayes, Santa Rosa.
J. F. Hetty and daughter, San Francisco.
W W. Hill, Stockton.
W. P. Hyatt.
S. G. Jackson and friend, Berkeley.
Hugh W. Kimball, Oakland.
G. J. King, Oakland.
Robert King, Oakland.
C. B. Kinney, San Francisco.
Louis Levy and wife, San Francisco.
Frank C. Lyman, Stockton.
W. L. Mitick, Oakland.
Fred Moore, Alameda.
M. F. Nagle, Oakland.
J. M. Nightingale, Modesto.
A. E. Nylen, Oakland.
A. Patzer, Stockton.
J. W. Redpath, San Francisco.
H. C. Reid, San Francisco.
C. S. Renwick and wife, Richmond.
T. Scott, Sacramento.
M. L. Scobey, San Francisco.
C. V. Schneider and wife, Sacramento.
E. C. Shafer, Stockton.
Geo. A. Sittman, San Francisco.
Geo. D. F. Smith San Francisco.
Frank J. Somers and wife, San Jose.
C. E. Stanley and wife, Stockton.
H. P. Stow, San Francisco.
H. S. Tittle and wife, San Francisco.
J. R. Tomlinson, Portland.
Hugh L. Tinling, Spokane.
F. J. Wallace, Lodi.
Harry S. White, Stockton.
L. F. Youdall and wife, Stockton.
Electric & Machine Equipment Co., Stockton.
Electric Engineering & Supply Company.

Jobbers

W. S. Berry, Western Electric Company.
C. H. Carter, Pacific States Electric Co.
Geo. G. Drew, Pacific States Electric Co.
A. H. Elliott, San Francisco.
W. L. Goodwin, Pacific States Electric Co.
M. E. Hickox, Pacific States Electric Co.
C. C. Hillis, Electric Appliance Company.
J. W. Hooker, Thos. Day Co.
H. H. Hoxie, Electric Ry. & Mfrs. Supply Co.
Frank Killam Pacific States Electric Co.
W. B. Lewis, Western Electric Company.
W. C. Martinez, Western Electric Co.
R. F. McDonald and wife, Holabird-Reynolds Co.
A. Meinema, Electric Appliance Co.
M. S. Orrick, Western Electric Company.
H. A. Sayles, Holabird-Reynolds Co.
H. F. Schultz, Electric Appliance Co.
A. E. Skillicorn, Pacific States Electric Co.
W. D. Thomas, Electric Ry. & Mfrs. Supply Co.
C. E. Wiggin, Dunham, Carrigan & Hayden Co.
C. J. Winslow, Electric Appliance Co.
A. Youngholm and wife, Electric Ry. & Mfrs. Supply Co.

Central Station.

H. A. Abernathy, Pacific Gas & Electric Co.
H. H. Adams, Oro Electric Corp.
J. M. Hall and wife, Pacific Gas & Electric Co.
Samuel Kahn and wife, Western States Gas & Electric Co.
Lee H. Newbert, Pacific Gas & Electric Co.
S. V. Walton, Pacific Gas & Electric Co.
E. A. Wilcox, Great Western Power Co.

Miscellaneous.

R. J. Guyett, San Francisco.
Electrical World.
Journal of Electricity, Power and Gas.
Electrical Review and Western Electrician.
W. A. Murphy, City Electrician, Stockton.
A. J. Cleary, Board of Fire Underwriters.
L. A. Lewis, Oakland Board of Education.

Manufacturers.

R. M. Alvord, General Electric Co.
R. A. Balzari and wife, Westinghouse Elec. & Mf. Co.
A. E. Drendell Drendell Elec. & Mfg. Co.
T. E. Bibbins, General Electric Company.
G. A. Gray, Crouse-Hinds Co.
S. B. Gregory, Arrow Electric Company.
W. B. Hall, Pass & Seymour, Inc.
J. C. Manchester, Interstate Electric Novelty Co.
R. W. Murphy, Westinghouse Lamp Co.
W. C. North, General Electric Company.
Paul V. Quick, Landers, Frary & Clark.
F. H. Poss, Benjamin Electric Company.
Frank Quinn, Manhattan Electric Supply Co.
A. E. Rowe, Telephone Electric Co.
H. E. Sanderson Bryant Electric Co.
W. B. Sawyer, U. S Steel Products Co.
H. B. Squires, San Francisco.
H. F. Yost, Trumbull Electric Company.

NEWS NOTES

INCORPORATIONS.

CARLTON, ORE.—Prune Center Telephone Company, $6000, by C. F. Jenson, H. J. Kellogg, W. H. Meedel and F. B. Weidner.

SALT LAKE CITY, UTAH.—Duchesne Power Company, $25,000, shares $100 each, by J. S. Dean, president; W. H. Cammerer, W. L. Dean et al.

ILLUMINATION.

STOCKTON, CAL.—The board of library trustees has awarded the contract for installing a new lighting system to E. L. Gnekow for $1780.

VISALIA, CAL.—The sum of $50,000 will be spent by the Central California Gas Company for improvements in the Visalia generating station.

FRESNO, CAL.—Sealed bids will be received by the supervisors up to August 8th for the installation of an eleectrolier lighting system in Court House park.

PHOENIX, ARIZ.—A petition has been presented to the city commission protesting against the calling of an election to determine whether the city shall build a municipal lighting and gas plant.

WICKENBURG, ARIZ.—A $17,000 bond issue has been voted for the purpose of making additions and improvements to the existing water system and the installation of an electric plant.

MERCED, CAL.—The trustees have decided to form a lighting district to embrace the business section. Chas. T. Phillips of San Francisco has been engaged to outline plans for the district.

PHOENIX, ARIZ.—A proposition has been made to the city by the South Side Gas & Electric Company for the sale of its entire holdings to the city. A committee has been appointed to make investigations as to the advisability of the deal.

WATTS, CAL.—A resolution of intention has been adopted by the board of trustees for the improvement of Melvin avenue from Shorb avenue to Main street, by the construction of ornamental electroliers on the east side of the street.

SUNNYSIDE, WASH.—V. V. Vercee in the interests of the Pacific Power & Light Company, has asked the council to consider a 50 year franchise. The company will erect an office building at the site of the substation if the franchise is granted. He also offered to install new street lights.

TRANSMISSION.

CHICO, CAL.—The Pacific Gas & Electric Company is making improvements to its substation in this district.

RANDOLPH, UTAH.—The Swan Creek Light & Power Company has signified its willingness to extend its line into Randolph this summer.

OAKLAND, CAL.—The Great Western Power Company has paid $6522 into the city treasury, which represents 2 per cent of the gross receipts of the corporation from October 25, 1914, to October 25, 1916.

NEWPORT, WASH.—The Northern Idaho & Montana Power Company is figuring on building a transmission line from the Newport substation to Dalkena to furnish power for the new plant of the Hedland Box & Shingle factory.

RIVERSIDE, CAL.—The Southern Sierras Power Company has applied to the supervisors for a franchise to operate for 50 years electric transmission lines along all public highways in Riverside county. Sealed bids will be received for for such a franchise up to August 9th.

PRATTVILLE, CAL.—The corps of engineers located at Butt Valley, Plumas county, and employed by the Great Western Power Company, is still running lines for the system of canals and tunnels to connect the Nevis Dam at a point near Prattville with a proposed plant at the mouth of Yellow Creek, near Humbug Valley.

WOODLAND, CAL.—The Northern California Power Company has been given a franchise to operate in any part of the county exclusive of incorporated towns. It is understood that the company will confine its activities to the Dunnigan district, in the northern part of the county, the Pacific Gas & Electric Company having failed to extend its lines to that section.

IRRIGATION.

BUTTE CITY, CAL.—The Western Canal Company, which has completed its irrigation system on the west side of Butte Creek, is prepared to extend its canals to the Colusa county line if the farmers in that section will sign up for the water.

REDDING, CAL.—It is reported that George W. Peltier, the Sacramento banker, and E. G. Hopson, former chief engineer of the reclamation service, have purchased all the real estate holdings of the Emma Joseph estate in Shasta county. It is said that the owners want to put all the land under irrigation from the Anderson-Cottonwood district.

YREKA, CAL.—A. L. Harlow of Montague, who with Oakland men has been placing several thousand acres of sage brush land under irrigation in the Big Springs district and placing settlers thereon, has purchased 500 acres of the level valley land south of Grenada and is to commence operations immediately to place the tract under irrigation.

LINDSAY, CAL.—The directors of the Lindsay-Strathmore irrigation district have voted to re-advertise for bids for the construction of the system. This action was taken following a request from a number of bidders who were unable to have their bids completed by the date originally set for the opening of the bids. The bonds, amounting to $1,400,000, will also be re-advertised for sale.

RIVERDALE, CAL.—Users of water in the Laguna and Riverdale conservation districts are preparing to take advantage of the proposed building of the Pine Flat storage. Petitions will ask the supervisors to call an election to vote for the establishment of an irrigation district to include these points. Engineers at work on the scheme to reclaim the Tulare Lake basin say that the general plans are progressing rapidly.

MODESTO, CAL.—The Turlock irrigation district is coming in for its share of the $254,000 to be paid to the Modesto irrigation dihtrict by the Waterford irrigation district upon an agreement entered into between the two districts, whereby Waterford is to receive water diverted from the La Grange dam, according to a demand made by the Turlock district in the form of a resolution presented at the adjourned meeting of the directors of the Modesto irrigation district.

Wanted and For Sale

The rate for advertisements in this column is $1.00 per insertion for 25 words or less; additional words 2 cents each, payable in advance. Remittance and copy should reach this office not later than Monday noon for the next succeeding issue. Replies may be sent in care of the **Journal of Electricity, Power and Gas**, Crossley Building, San Francisco.

OPEN FOR ENGAGEMENT—Competent accountant and licensed attorney, having fourteen years' experience as chief accountant, cashier and secretary of large electrical firm in San Francisco, open for position July 20th. Moderate salary. Apply Box 111, Journal of Electricity, Power and Gas, Crossley Bldg., S. F.